

## CLAIMS

We claim:

- 1           1.     A method of wireless connectivity comprising:  
2           broadcasting a beacon by a server; and  
3           receiving and storing the beacon at the client, the client further retaining  
4           information indicative of a path to the server; and  
5           rebroadcasting the beacon by the client.
- 1           2.     The method of claim 1, comprising:  
2           storing every beacon received;  
3           designating one path identified by one beacon as the optimal path;  
4           setting a default gateway as identified in the optimal path; and  
5           rebroadcasting only the beacon representing the optimal path.
- 1           3.     The method of claim 1, wherein the beacon broadcast by the server  
2           includes a hop-count set to zero, the method further comprising:  
3           each client that receives the beacon rebroadcasting the beacon with the  
4           hop-count incremented by one;  
5           such that each client receiving the beacon knows a way to reach the server  
6           and the number of hops in this path.
- 1           4.     The method of claim 1, wherein the beacon broadcast by the server

2 includes server address, such that each client receiving the beacon knows the  
3 address of the server.

1 5. The method of claim 1 further comprising:  
2 each client that receives the beacon rebroadcasting the beacon with an  
3 address of the client added to the beacon;  
4 such that each client receiving the beacon has a complete path to the  
5 server.

1 6. The method of claim 1, wherein the beacon includes a sequence  
2 number representing a current routing cycle.

1 7. The method of claim 6, further comprising, upon a client receiving  
2 a beacon,  
3 determining if a beacon has already been received for this routing cycle;  
4 and  
5 if no beacon has already been received for the routing cycle, storing a  
6 routing path to the server from the beacon.

1 8. The method of claim 7, further comprising, if the beacon has  
2 already been received for the routing cycle:  
3 determining if this beacon has a higher sequence number than a prior  
4 beacon for this routing cycle, and if so,

5 storing the current beacon in memory.

1 9. The method of claim 6, further comprising, upon a client receiving  
2 a beacon,  
3 determining if a currently received beacon represents an optimal path for  
4 this routing cycle; and  
5 if the current beacon represents the optimal path, identifying a default  
6 gateway in the current beacon, and storing the default gateway.

1 10. The method of claim 2, further comprising:  
2 determining if there is a previous default gateway identified; and  
3 deleting the previous default gateway from memory.

1 11. The method of claim 1, further comprising, for each client:  
2 collecting all beacons; and  
3 selecting a single beacon to rebroadcast.

1 12. The method of claim 11, wherein selecting a beacon comprises:  
2 identifying a number of hops between the server and the client for each  
3 beacon; and  
4 selecting the beacon with the lowest number of hops.

1 13. The method of claim 11, wherein selecting a beacon comprises:

2 identifying a traffic monitoring code (TMC) for each of the beacons; and  
3 selecting the beacon with the lowest TMC.  
4

1 14. The method of claim 11, wherein selecting a beacon comprises:  
2 identifying a beacon with a highest quality; and  
3 selecting the beacon with the highest quality.  
4

1 15. The method of claim 14, wherein the highest quality is a best  
2 signal-to-noise ratio.  
3

1 16. The method of claim 14, wherein the highest quality is based on  
2 most back end bandwidth capacity at the server.  
3

1 17. The method of claim 14, wherein the highest quality is based on a  
2 lowest level of traffic being handled by the server.  
3

1 18. The method of claim 1, further comprising:  
2 sending a reverse beacon to the server; and  
3 constructing a client tree in the server, wherein the server has a path to all  
4 clients.

1 19. A server for wireless communications comprising:  
2 a beacon logic to generate a beacon and broadcast the beacon; and

3           a wireless transceiver to receive a plurality of reverse beacons, the reverse  
4 beacons indicating a path to each of the clients; and

5           a client tree storing the path to each of the clients, such that the server can  
6 send data to any client, either directly or through other clients on the network.

1           20.     The server of claim 19, further comprising a monitoring logic to  
2 monitor a network, the monitoring logic using the client tree to generate a map  
3 of the network of clients.

1           21.     A method of generating a routing path for a system including a  
2 server and a plurality of clients, the method comprising each client:  
3           receiving a beacon from the server;  
4           rebroadcasting one beacon received from an upstream node; and  
5           broadcasting a reverse beacon upstream, the reverse beacon being  
6 addressed to the known upstream node, the reverse beacon used by the server  
7 and each client to set up a routing table.

1           22.     The method of claim 21, wherein a routing table in a particular  
2 client includes a default gateway and a path to each client downstream from the  
3 particular client.

1           23.     The method of claim 21, further comprising the server broadcasting  
2 a dummy reverse beacon to initiate the reverse beacon cycle.

1           24.     The method of claim 21, further comprising each client aggregating  
2     the reverse beacons received from downstream clients, and sending a single  
3     reverse beacon including the aggregated information.

1           25.     The method of claim 21, wherein receiving a reverse beacon  
2     broadcast by a client's default gateway triggers the client to start a timer to send  
3     the reverse beacon.

1           26.     The method of claim 21, further comprising, if a client receives  
2     multiple beacons:  
3             evaluating a link quality of each of the beacons received; and  
4             selecting the default gateway based on the beacon with the best link  
5     quality and rebroadcasting that beacon.

1           27.     The method of claim 26, wherein the link quality comprises  
2     reliability of the beacon.

1           28.     The method of claim 26, wherein the link quality includes  
2     information about the back end bandwidth capacity of the server.

1           29.     The method of claim 26, wherein the link quality includes  
2     information about the traffic being handled by the server.

1           30.     The method of claim 21, wherein a connection between the server  
2     and the client is a wireless connection.

1           31.     The method of claim 21, wherein a connection between the server  
2     and the client is chosen from among the following types of connections: a  
3     wireless connection, a wired connection, and a switched connection.

1           32.     The method of claim 21, further comprising the client:  
2             receiving a plurality of beacons from a plurality of servers; and  
3             selecting one of the plurality of beacons, and setting the server associated  
4     with the selected beacon as its preferred server;  
5             thereby self-selecting to belong in a cluster associated with the preferred  
6     server.

1           33.     The method of claim 32, further comprising the client:  
2             moving outside the cluster;  
3             upon receiving a beacon from a new cluster, the client setting the server  
4     associated with the new beacon and the new cluster as its preferred server.

1           34.     The method of claim 33, further comprising:  
2             expiring a routing table including a previous preferred server and  
3     previous default gateway.

1           35.     A routed wireless network comprising:  
2           a plurality of wired access points;  
3           a plurality of clients, each client belonging to a cluster of clients  
4     administered by a single server and such that membership in a cluster is elected  
5     by the client through the selection of a beacon to rebroadcast.

1           36.     The network of claim 35, wherein the membership in the cluster  
2     may change as a result of a client roaming from one region to another within the  
3     network.

1           37.     The network of claim 35, wherein the membership in the cluster  
2     may change as a result of the addition of a new server to the network.

1           38.     The network of claim 35, wherein the new server may be a client  
2     that is converted into a server by adding a wired connection.

1           39.     The network of claim 35, wherein the membership in the cluster  
2     may change as a result of the server selected by the client failing to provide  
3     adequate service.